

STATUS REPORT: STRUCTURAL PERFORMANCEProject 2695-21 -- Evaluation and Modification of the STFI Strip  
Compression Tester

## SUMMARY - OCTOBER, 1980

The new instrument ordered for this project was received in early August. A sufficient number of samples were tested to evaluate both within grade and overall correlations between the two STFI testers and between STFI results and other edgewise compression test results. Statistical analysis of the data will be completed soon.

The components for the moisture compensation package have been ordered and are expected by mid-September. Modifications to electrically isolate the two pairs of clamps are underway.

## STATUS

The new STFI tester ordered for this project was received in early August. The instrumental problems encountered with the loan tester, which we have had for some months, have apparently been remedied by the instrument maker. No problems were encountered with the new tester.

Calibration of the load-weighing system was checked by supporting the tester on its side and then applying dead-weight loads to the stationary clamp. This calibration procedure requires a compensation for the effective weight of the stationary clamp. This can be accomplished by either zeroing out the effective weight of the clamp or by physically lifting the clamp off the load cell while setting zero. Both procedures yielded identical calibration data. Our calibration showed a linear calibration difference from that of the manufacturer of 0.9%. This is within the manufacturer's tolerance of  $\pm 1\%$ ; nevertheless, the tester was adjusted to agree with our

calibration. Comparative testing between the two STFI testers, regular ring compression, and Weyerhaeuser compression has been completed for a variety of medium and 26-lb, 33-lb, 42-lb, 69-lb, and 90-lb linerboard samples. The number of samples tested has been significantly increased from that reported in May to permit a statistical comparison of data for each grade weight. A visual comparison of the results suggests that the correlations will be quite good. A statistical analysis of the data will be completed in the near future.

A block diagram of the planned moisture compensation package is shown on the next page. The electrical resistance of the test portion of the sample will be measured. The log of this resistance is linearly related to moisture content. The log and conditioning amplifiers with correct scaling, level shifting, and gain factors will give an output of 1 volt per percent moisture. The summing amplifier and divider will solve the equation:

$$STFI_R = \frac{STFI_A}{\{a - b(M)\}}$$

where  $STFI_R$  is the computed edge compression strength at a reference moisture content and  $STFI_A$  is the measured edge compression strength at the ambient moisture content  $M$ . The constants  $a$  and  $b$  will need to be determined. The selector switch will allow direct readout of  $STFI_A$ ,  $STFI_R$ , or  $M$ . The parts needed to electrically isolate the two pairs of clamps are being manufactured. These parts and the electronic components are expected by mid-September.

